REMARKS

Applicant respectfully requests reconsideration of the present U.S. Patent application as amended herein. Claims 1-11, 19-24, 27, 28 and 33 have been amended. Claims 44-48 have been added. Claims 10-18 have been canceled without prejudice. Thus, claims 1-9 and 19-48 are pending.

Amendments to the Claims

The claims have been amended to more particularly point out and distinctly claim the subject matter of the invention. In many cases the amendments broaden the claims and have not been made to overcome the references relied upon by the Office Action.

Objection to the Drawings

The drawings were objected to as failing to comply with 37 C.F.R. § 1.84(p)(5) for including reference numerals not included in the description. The specification has been amended to be consistent with the drawings. Figures 3 and 7 have been amended to be consistent with the specification as filed. A Request to Approve Drawing Changes is filed herewith. Therefore, Applicants request that the objection to the drawings be withdrawn.

Objection to the Specification

The specification was objected to for informalities. The Specification has been amended to provide an application number for a co-pending application referenced in the Background section. Therefore, Applicants request that the objection to the specification withdrawn.

Claim Rejections - 35 U.S.C. § 103(a)

Claims 1, 2, 4, 5, 19, 20, 23, 24 and 26-28 were rejected as being unpatentable over U.S. Patent No. 4,897,639 issued to Kanayama (*Kanayama*) in view of U.S. Patent No. 5,936,599 issued to Reymond (*Reymond*). For at least the reasons set forth below, Applicants submit that claims 1, 2, 4, 5, 19, 20, 23, 24 and 26-28 are not rendered obvious by *Kanayama* and *Reymond*.

Claim 1 recites:

> a first set of light emitting devices(LEDs) to generate light having a first wavelength during a first emission time period;
> a second set of LEDs to generate light having a second wavelength during a second emission time period, the second wavelength being different from the first wavelength;
> ...
> first and second light transmission guides to route light from the first and second sets of LEDs to a first and second display device.

Thus, Applicants claim transmission guides to route light from the sets of LEDs to multiple display devices. Claim 19 is a means-plus-function claim and similarly recites routing light from multiple sets of LEDs to multiple display devices.

Kanayama discloses an image forming apparatus having a drive circuit to drive multiple light-emitting diodes. See Abstract and Figure 3. *Kanayama* discloses adjacent LED arrays that are used to form lines of an image on a single screen (which is not a display device as claimed). See col. 2, line 54 to col. 3, line 24. However, *Kanayama* does not disclose multiple transmission guides to route light from multiple sets of LEDs to multiple display devices.

Reymond is cited to teach a power source coupled with an LED array. See Office Action at page 3. While *Reymond* does disclose a power source, *Reymond* does not disclose multiple transmission guides to route light from multiple sets of LEDs to

multiple display devices. Therefore, *Reymond* does not cure the deficiencies of *Kanayama* and not combination of *Reymond* and *Kanayama* can result in the invention as claimed in claims 1 and 19.

Claims 2, 4, 5 and new claims 44-48 depend from claim 1. Claim 20 depends from claim 19. Because dependent claims include the limitations of the claims from which they depend, Applicants submit that claims 2, 4, 5, 20 and 44-47 are not rendered obvious by *Kanayama* and *Reymond* for at least the reasons set forth above.

Claim 23 recites:

> receiving a respective first and second color frame image data;
> generating a first and second control signal in accordance with the respective first and second color frame image data;
> generating light having a first wavelength from a first LED color channel during a first emission time frame in response to the first control signal;
> generating light having a second wavelength from a second LED color channel during a second emission time frame in response to the second control signal; and
> propagating the light from the first and second LED color channels to first and second display devices.

Thus, Applicants claim a method including propagating light from multiple LED color channels to multiple display devices. Claims 24 and 26-28 depend from claim 23.

As discussed above, no combination of *Reymond* and *Kanayama* teaches or suggests propagating light from multiple LED color channels to multiple display devices. Therefore, combination of *Reymond* and *Kanayama* renders claims 23, 24 and 26-28 obvious.

Claims 7-9, 31 and 32 were rejected as being unpatentable over U.S. Patent No. 6,396,466 issued to Pross, et al. (*Pross*) in view of *Kanayama* and *Reymond*. Claims 7-9 depend from claim 1. Claims 31 and 32 depend from claim 23.

Pross is cited to teach a control circuit. However, *Pross* does not teach or suggest propagating light from multiple LED sources to multiple display devices. Thus, *Pross* does not cure the deficiencies of *Kanayama* and *Reymond*. Therefore, no combination of *Kanayama*, *Reymond* and *Pross* can teach or suggest the invention as claimed in claims 7-9, 31 and 32.

Claims 10-12, 14-18, 21, 22, 29, 30, 34, 35 and 37-42 were rejected as being unpatentable over *Kanayama* in view of *Pross*. Claims 10-12 and 14-18 have been canceled. Thus, the rejection of claims 10-12 and 14-18 is moot. For at least the reasons set forth below, Applicants submit that claims 21, 22, 29, 30, 34, 35 and 37-42 are not rendered obvious by *Kanayama* and *Pross*.

As mentioned above, neither *Kanayama* nor *Pross* teach or suggest routing light from multiple LED sources to multiple display devices. Therefore, no combination of *Kanayama* and *Pross* can teach or suggest the invention as claimed in claims 21, 22, 29, 30, 34, 35 and 37-42.

Claims 13, 33, 36 and 43 were rejected as being unpatentable over U.S. Patent No. 5,724,062 issued to Hunter (*Hunter*) in view of *Kanayama* and *Pross*. Claim 13 has been canceled. Thus, the rejection of claim 13 is moot. For at least the reasons set forth below, Applicants submit that claims 33, 36 and 43 are not rendered obvious by *Hunter*, *Kanayama* and *Pross*.

Hunter is cited to teach use of LEDs in a LCD. See Office Action at page 10. However, Applicants claim routing light from multiple sets of LEDs to multiple display devices, which is different that what *Hunter* is cited to teach. Therefore, whether or not

Hunter discloses use of LEDs in a LCD, no combination of *Hunter* with *Kanayama* and *Pross* can teach or suggest the invention as claimed in claims 33, 36 and 43.

Claims 6, 30 and 41 were rejected as being unpatentable over DE 4234293 to Fischer (*Fischer*) in view of *Kanayama* and *Pross*. Fischer is not cited to disclose any specific claim limitation. Therefore, the Office Action has failed to provide a *prima facie* case of obviousness for claims 6, 30 and 41.

Conclusion

For at least the foregoing reasons, Applicants submit that the rejections have been overcome. Therefore, claims 1-43 are in condition for allowance and such action is earnestly solicited. The Examiner is respectfully requested to contact the undersigned by telephone if such contact would further the examination of the present application.

Please charge any shortages and credit any overcharges to our Deposit Account number 02-2666.

Respectfully submitted,
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MARKED VERSION OF THE AMENDEMENTS

IN THE SPECIFICATION

The paragraph on page 3, lines 12-18:

> An alternative technique is to use an array of light emitting devices (LEDs) as the source of light in projection display systems. The use of an LED light source substantially eliminates the mechanical, optical, and electrical rotational timing errors that are intrinsic to color wheel systems, and is described in a commonly assigned co-pending patent application Ser. No. [_____] 09/823,448, by Fred Parker et al. and entitled "System and Method Employing LED Light Sources for a Projection Display," the subject matter of which is herein incorporated by reference.

The paragraph on page 7, lines 12-20:

> Display device 44 is preferably a digital micro-mirror device (DMD) but may alternatively be a reflective liquid crystal on semiconductor (LCOS) array device or an LCD light valve. Projection lens group 46 preferably includes a fixed focal length lens but may also include a varifocal or zoom lens. The optical components are preferably held together by a magnesium die-cast optical frame 48 (only a portion of which is shown) within a projector housing (not shown) which is mechanically rigid and dissipates heat. Such frames and housings are well known to skilled persons and can be adapted to house a cooling fan 50 for cooling the optical components and facilitate cooling air flow [52]. Power supply 34 can also be used to power a cooling fan [50] (not shown in Figure 2) and display controller 56.

The paragraph on page 8, line 26 to page 9, line 3:

> Fig. 3 presents an embodiment in which light sources 32 comprise multiple LED arrays 70 of multiple LEDs 72 on a substrate 74 and light transmission guides 38 include optical fibers 76. Light sources 32 may also comprise arrays of multiple laser diodes as the multiple LED arrays 70 without departing from the principles of the invention. Ends of optical fibers 76 extend through, and are held in place by, holes [78] in a cover plate 80 and are mated to LEDs 72 in a one-to-one relationship. In this embodiment, the LEDs 72 and holes [78] are aligned in rows 82 and columns 84.

IN THE CLAIMS

1. (Amended) An apparatus [A circuit for driving an array of light emitting devices (LEDs)] comprising:

a first set of [series connected] light emitting devices(LEDs) to generate [a first] light having a first wavelength during a first emission time period [frame];

a second set of [series connected] LEDs to generate [a second] light having a second wavelength during a second emission time period [frame], the second wavelength being different from the first wavelength;

[a power supply providing a shared current source to the first and second set of LEDs;

a first switch arranged in series with the first set of LEDs;

a second switch arranged in series with the second set of LEDs; and]

a display controller coupled to [the power supply and] the first set of LEDs and the second set of LEDs [switches], the display controller [adapted] to generate a first and second control signal respectively in accordance with a first and second color frame [sequential] data, the first control signal [operating on at least the power supply or the first switch] to enable [drive] the first set of LEDs during the first emission time period [frame], and the second control signal [operating on at least the power supply or the second switch] to enable [drive] the second set of LEDs during the second emission time

period [frame, wherein the first and second emission time frames are contiguous with one another]; and

first and second light transmission guides to route light from the first and second sets of LEDs to a first and second display device.

2. (Amended) The apparatus [circuit] of claim 1, further comprising:

a third set of [third] LEDs to generate [a third] light having a third wavelength during a third emission time period [frame], the third wavelength being different from the first and second wavelengths;

[a third switch coupled to the third set of LEDs;

wherein the power supply provides the shared current source to the third set of third LEDs;] and

a third light transmission guide to route light from the third set of LEDs to the display device;

wherein the display controller is further [adapted] to generate a third control signal in accordance with a third color frame [sequential] data[, the third control signal operating on at least the power supply or the third switch] to enable [drive] the third set of LEDs during the third emission time frame[, wherein the third emission time frame is contiguous with the first and second time frames].

3. (Amended) The apparatus [circuit] of claim 2 wherein the first, second, and third sets of LEDs emit red, green, and blue light, respectively.

4. (Amended) The apparatus [circuit] of claim 2 wherein the first, second, and third sets of LEDs emit yellow, cyan, and magenta light, respectively.

5. (Amended) The apparatus [circuit] of claim 2 wherein the first, second, and third sets of LEDs are light emitting diodes.

6. (Amended) The apparatus [circuit] of claim 2 wherein the first, second, and third sets of LEDs are laser diodes.

7. (Amended) The apparatus [circuit] of claim 2, further comprising first, second and third switches coupled between the display controller and the first, second and third sets of LEDs, respectively, wherein the display controller generates a compensating control signal to operate on at least one of the first, second, and third switches to compensate for a failed LED in the first, second, and third sets of LEDs, respectively.

8. (Amended) The apparatus [circuit] of claim 2, wherein the first, second, and third control signals further operate on a current level of [the] a current source to

adjust the brightness of the light emitted by the first, second, and third sets of LEDs, respectively.

9. (Amended) The apparatus [circuit] of claim 2, wherein at least one of the first, second, and third sets of [series connected] LEDs [is] further comprises [comprised] of at least one set of series-parallel arrays of LEDs[, respectively].

19. (Amended) A circuit [for driving an array of light emitting devices (LEDs)] comprising:

a means for generating [a first] light having a first wavelength during a first emission time frame from a first set of [series connected] light emitting devices (LEDs);

a means for generating [a second] light having a second wavelength during a second emission time frame from a second set of [series connected] LEDs, the second wavelength being different from the first wavelength;

a means for providing a shared current source to the first and second set of LEDs from a power supply;

[a means for arranging a first switch in series with the first set of LEDs;

a means for arranging a second switch in series with the second set of LEDs; and]

a means for coupling a display controller to the power supply and the first and second sets of LEDs [switches], the display controller adapted to having a means for generating a first and second control signal respectively in accordance with a first and

second color frame sequential data, the first control signal operating [on at least the power supply or the first switch] to drive the first set of LEDs during the first emission time frame, and the second control signal operating [on at least the power supply or the second switch] to drive the second set of LEDs [during the second emission time frame]; and

means for routing the light from the first and second sets of LEDs to first and second display devices.

20. (Amended) The circuit of claim 19, further comprising:

a means for generating [a third] light having a third wavelength during a third emission time frame from a third set of [third] LEDs, the third wavelength being different from the first and second wavelengths;

[a means for coupling a third switch to the third set of LEDs;]

a means for providing the shared current source to the third set of LEDs from the power supply; and

means for routing the light from the first and second sets of LEDs to first and second display devices;

wherein the display controller is further adapted [to having a means] for generating a third control signal in accordance with a third color frame sequential data, the third control signal operating [on at least the power supply or the third switch] to drive the third set of LEDs [during the third emission time frame].

21. (Amended) A circuit [for driving an array of light emitting devices (LEDs)] comprising:

a means for generating [a first] light having a first wavelength from a first set of [series connected] light emitting devices(LEDs);

a means for routing the light from the first set of LEDs to a first display device;

a means for generating [a second] light having a second wavelength from a second set of [series connected] LEDs, the second wavelength being different from the first wavelength;

a means for routing the light from the second set of LEDs to a second display device;

a means for providing a first and second current source from a power supply to the first and second set of LEDs, respectively;

a means for coupling a display controller to the power supply, the display controller adapted to having a means for generating a first and second control signal respectively in accordance with a color frame data, the first control signal operating on the first current source to drive the first set of LEDs [continuously], and the second control signal operating on the second current source to drive the second set of LEDs [continuously].

22. (Amended) The circuit of claim 21, further comprising:

a means for generating [a third] light having a third wavelength from a third set of [series connected third] LEDs, the third wavelength being different from the first and second wavelengths;

a means for routing the light from the third set of LEDs to a third display device;

a means for providing a third current source from the power supply to the third set of LEDs; and

wherein the display controller is further adapted to having a means for generating a third control signal in accordance with the color frame data, the third control signal operating on the third current source to drive the first set of LEDs [continuously].

23. (Amended) A method for driving an array of light emitting devices (LEDs) in a projection display system comprising:

receiving a respective first and second color frame [sequential] image data [for driving an imaging device];

generating a first and second control signal in accordance with the respective first and second color frame [sequential] image data;

generating [a first] light having a first wavelength from a first LED color channel during a first emission time frame in response to the first control signal;

generating [a second] light having a second wavelength from a second LED color channel during a second emission time frame in response to the second control signal; and

propagating the light from the first and second LED color channels [lights] to [the imaging device] first and second display devices.

24. (Amended) The method of claim 23, further comprising:

receiving a respective third color frame [sequential] image data [for driving the imaging device];

generating a third control signal in accordance with the respective third color frame [sequential] image data;

generating [a third] light having a third wavelength from a third LED color channel during a third emission time frame in response to the third control signal; and propagating the [third] light from the third LED color channel to the [imaging] display device.

27. (Amended) The method of claim 23 wherein the first, second, and third control signals operate on a power supply coupled to the first, second, and third LED color channels to [sequentially generate] enable the first, second, and third [lights] LED color channels, respectively.

28. (Amended) The method of claim 23 wherein the first, second, and third control signals operate on a first, second, and third switch coupled to the first, second, and third LED color channels to [sequentially generate] enable the first, second, and third [lights] LED color channels, respectively.

33. (Amended) The method of claim 23, wherein the [imaging] display device comprises a DMD, LCOS, or LCD.